Translated into English from the German original

Patent claims

1. Multi-channel metering apparatus with automatic calibration with several dispensing channels (1) respectively with a nozzle (2) and a micro-valve (4), whereby the micro-valves (4) respectively exhibit a discharge opening (3), which is respectively connected with one of the nozzles (2) and at least one supply opening (5 or 6) is respectively present on the micro-valves (4), which are respectively connected with an outlet of a distributor (8, 13 or 15), the inlet of which is indirectly connected via a flow sensor (10) with a vessel (9, 14 or 17) filled with a fluid and the paths between the inlet and the outlets of the distributor exhibit the same fluidic resistance as well as a pressure source (19) to produced overpressure in the vessel (9, 14 or 17) and a control unit (16) connected with the flow sensor (10) and the micro-valves (4) and generates the individual control signals for the micro-valves (4) from the measured values received from the flow sensor (10).

2. Multi-channel metering apparatus in accordance with Claim 1, characterized by,
the fact that the supply openings (5 or 6) are first supply openings (5) and second supply openings (6), whereby the first supply openings (5) are respectively connected with an outlet of the distributor (8, 13 or 15), which here is a calibration medium distributor (8) filled with a calibration medium, and the second supply openings (6) which respectively exhibit a connection with a respective dispensing medium vessel (12) such that at the first supply openings (5) the calibration fluid and at the second supply openings (6) the dispensing fluid is available and on admission of the vessel (9, 14 or 17), which here is a calibration medium vessel (9) with pressure via an opened micro-valve (4) calibration fluid is delivered, whereby the dispensing channels are calibrated in relation to each other with the calibration fluid.

3. Multi-channel metering apparatus in accordance with Claim 1, characterized by,
the fact that the supply openings (5 or 6) are first supply openings (5) and second supply openings (6), whereby the first supply openings (5) are respectively connected with an outlet of

End of the translation

the distributor (8, 13 or 15), which here is a calibration medium distributor (8) filled with a calibration medium, and the second supply openings (6) respectively exhibit a connection with a

dispensing medium vessel (12) such that at the first supply openings (5) and at the second supply openings (6) the dispensing fluid is available and on admission of the vessel (9, 14 or 17), which here is a calibration medium vessel (9) with pressure via an opened micro-valve (4) dispensing fluid is delivered, whereby the dispensing channels can be calibrated in relation to each other with different dispensing fluid.

4. Multi-channel metering apparatus in accordance with Claim 1, characterized by, that the distributor (8, 13 or 15) is a rinsing agent distributor (13) and the vessel (9, 14 or 17) is a rinsing agent vessel (14) and both are indirectly connected with each other, whereby in parallel to the flow through the flow sensor (10) a bypass (20) is present which allows for a high throughput volume of the purging fluid.

End of the translation

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Summary

Multi-channel metering apparatus with automatic calibration, where the individual dispensing channels 1, the micro-valves 4 of which are connected with the outlets of a distributor 8, 13 or 15 whose inlet is filled with fluid by a vessel 9, 14 or 17 thus connected, are able to be calibrated in relation to each other in that between the vessel 9, 14 or 17 and the inlet of the distributor 8, 13 or 15 a flow sensor 10 is arranged which for calibration during delivery of the fluid via a respective nozzle 2 of a respective dispensing channel 1 records the flow and generates signals which are respectively assigned to a defined opening time of a micro-valve 4 and a specific dispensing channel 1 and thus stored allows for individual control of the micro-valves 4 in order to equalize the tolerances of the dispensing channels 1.

Fig.1

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